

Affordable High Power Density Engine Designs for Personal Air Vehicles, Phase I

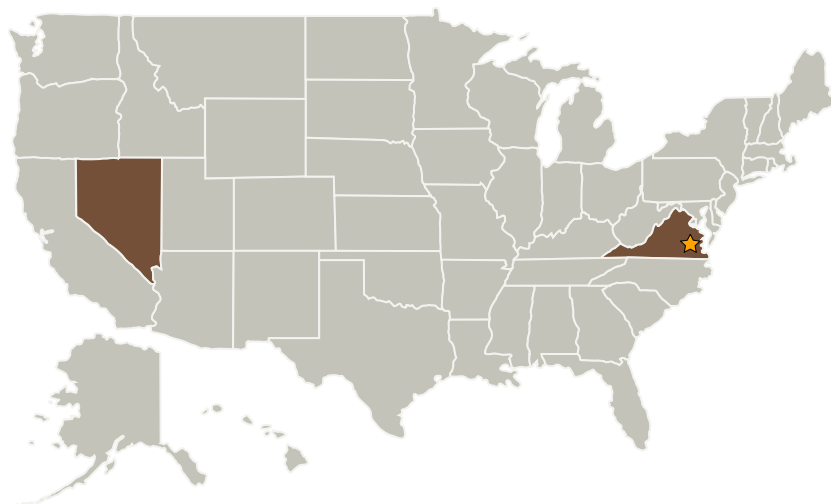
Completed Technology Project (2004 - 2005)



Project Introduction

Next generation General Aviation (GA) Sport Class air vehicles limited to 1200lbs, represent the first opportunity to overhaul the FAA certification process necessary to manufacture affordable aircraft. With propulsion representing over one-third of the direct manufacturing costs of the entire aircraft, dramatic reductions in aircraft engine costs must be achieved by design, economy of scale, and modern Quality Assurance (QA) manufacturing techniques. Future on-demand intra-urban Personal Air Vehicles (PAV) will require a breakthrough in affordable (\$20/hp) propulsion technology capable of STOL or VTOL performance with specific weight ratio above 1hp/lb. Affordable engines of this performance do not exist today. Therefore this propulsion system study proposes to examine 3 innovative concepts of widely different configurations, namely: Advanced Uniflow Supercharged 4-cycle; Advanced Contra-Prop Supercharged 2-cycle; and Free Piston/Turbine designs. The common design philosophy of maximum breathing capacity, unobstructed combustion chamber design, and high mechanical/structural efficiency ensures maximum power density on multi-fuels at the lowest cost. Economy of scale and QA production are approached by innovative/universal design that is aligned with recreational engine power and manufacturing practices.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
GSE Inc	Supporting Organization	Industry	Incline Village, Nevada

Primary U.S. Work Locations	
Nevada	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.3 Aero Propulsion
 - └ TX01.3.1 Integrated Systems and Ancillary Technologies